SESSION I KEYNOTE:

AGRICULTURE AND WETLANDS COMPATIBILITY

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ABSTRACT

The U.S. Swamp Lands Acts of the mid-nineteenth century set the stage for a negative mind set regarding wetlands that would persist to the present. No where has that mind set been as persistent as in agriculture. Issues surrounding the definition of wetland, property rights, and the role of science go largely unresolved. While wetlands and agriculture were incompatible a century ago, their differences have been ameliorated through technology, education, and cultural shifts. Today, there are many good examples of cooperation and compatibility between agriculture and wetlands.

INTRODUCTION

I am going to set the stage for the six papers that follow by providing a bit of history and a sense of where we are today and where we might be going with respect to agriculture and wetlands.

Until recently wetlands were seen as obstacles to agricultural development in the United States. Agriculture was responsible for conversion of more wetlands to other uses than perhaps any other human activity up to this point.

Wetland chronology in the Upper Great Plains

10,000 BC: glaciers retreated leaving millions of PRAIRIE POTHOLES that were from only a fraction of an acre to over a hundred acres in size

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1849, '50, '60: SWAMP Lands Acts, 65 million acres of swamp land given to 15 states if they would develop it and put it to productive uses. This began the negative mind set about wetlands.

1862: Homestead Act, settlers tamed the landscape. However, the technology to directly impact wetlands was not yet available so they had to farm around these obstacles.

1889: North Dakota became a state -- about 5 million acres of wetlands existed.

1934: Migratory Bird Hunting Stamp (Duck Stamp) allowed the federal government to use easements and fee title purchases to protect wetlands valuable for waterfowl production.

1943: USDA program to cost-share drainage is implemented. This added to the mind set that wetlands and agriculture were not compatible. Farmers are still using 12-foot grain drills and 40 horsepower tractors, so farming around wetlands is still mostly a nuisance.

1944: PL 566, federal government encourages drainage through coordination and mainstem ditches.

1954: Circular 39 describes wetland types (e.g., types I, II, III, IV and V) and identifies some of their values. The seed is planted that wetlands may have social values beyond waterfowl production.

1962: Reuss Amendment prohibits drainage subsidies for types III, IV, and V wetlands, advancing further the notion of public values.

1960: Environmental movement gives big boost to wetland protection. Federal government's aggressive wetland easement purchases began a controversy that is alive today. Large 4-wheel drive tractors and wider farm implements began to show up, causing wetlands to be more than just a nuisance to farming. Farmers have the horsepower to improve drainage on their cropland.

1972: Section 404 of the Clean Water Act is enacted. Although not intended to be a wetland protection law, it was later interpreted to include wetlands as "waters of the United States" and capable of supporting interstate commerce.

1977: President Carter issues Executive Order 11990 asking federal agencies to avoid impacting wetlands.

1978: No more drainage cost-sharing from USDA.

1985: The Farm Bill includes the strongest wetland protection measure ever to apply to agriculture -- Swampbuster. The Tax Reform Act and water development cost-sharing also indicate the federal government's intention to protect wetlands. The pendulum has now swung from wetlands as physical obstacle to wetlands as an institutional obstacle.

1986: The Emergency Wetlands Act and the North American Waterfowl Management Plan (restore duck populations to level of the 1970s) add to the momentum. In North Dakota, the Garrison Diversion Unit is reformulated from an irrigation project to a largely municipal-industrial water project partly due to continued pressure to not impact wetlands.

1987: North Dakota enacts nation's first no-net-loss of wetlands legislation and the first federal manual for defining and delineating jurisdictional wetlands is issued. This was the start of the ongoing wetlands definition/delineation problem.

1988: Presidential candidate George Bush promises a federal no-net-loss policy.

1989: The federal wetlands delineation manual is revised, broadening the definition of wetlands to include areas that never have water above the surface.

1990: Vice President Quayle's Competitiveness Council suggests narrowing the definition. Wetland proponents claim this will destroy 50 percent of the nation's wetlands.

1995: North Dakota repeals its no-net-loss legislation at the urging of agricultural interests and private property rights groups.

1996: Over ½ of ND wetlands have been converted to other uses. The State Water Commission is offering $50/acre to restore wetlands in the Devils Lake Basin for flood storage; they are getting few takers.

PRESENT SITUATION

Issues surrounding wetlands protection are conceptually the same around the world as they are here in North Dakota. While languages, topographical settings, and policies may vary widely, wetland issues fall into three areas (1) definition, (2) property rights, and (3) the role of science.

Definition

"Wetland definition and delineation remains the single most problematic social and technical aspect of developing effective and efficient wetland management policies." (Ludwig and Leitch 1995). Ludwig and Leitch include 111 references to delineation/definition issues in their selected bibliography of the literature from 1989 to 1993. The National Academy of Sciences was recently asked to define wetland and responded with a 300+ page book (National Research Council 1995). This is all because "wetland" is a concept that varies across time, space, and cultures and cannot be objectively defined by science (Council for Agricultural Science and Technology 1994).

Property Rights

Many of the outputs of wetlands generate benefits or costs well beyond defined property boundaries. Thus, the outputs of wetlands may "belong" to as many as four owners (owner, user, region, society). Property rights are not normally made explicit in law until a controversy arises--that controversy over who has the property right to wetland has brewed for at least three decades. The controversy between the rights of individuals and the rights of society has continued since at least the time of the ancient philosophers. Culture and the courts will ultimately decide who has the property right to wetlands, until then landowners and society will clash over who has the right to wetland resources.

Role of Science

Science plays an important, but lop-sided role, in the wetland controversy. Most of the weight of science is in favor of wetland protection. This is because most wetland scientists tend to conduct research that demonstrates the positive values of wetlands to society. There is little or no organized support for science to demonstrate the "down side" of wetlands, or the values of alternative uses of wetlands or other natural landscape features. Until the

science of natural resources use and management is broadened to include other landscape features and the full range of human values, it is likely only to add to controversy rather than lessen it.

These three issues are part of understanding the compatibility of wetlands and agriculture.

COMPATIBILITY

The compatibility of agriculture and wetlands spans a continuum from mutually exclusive to complementary. In the past, most agricultural activities were incompatible with wetlands (mutually exclusive); some were compatible; and few, if any, were complementary. However, as society, science, and agriculture have matured, fewer and fewer agricultural activities are totally incompatible with the maintenance of wetlands in agricultural land or in the rural landscape.

Compatibility can be viewed as physical, cultural, economic, or institutional/legal. The latter three can be overcome with "non-structural" fixes, but can be the most troublesome. For example, cultural compatibility involves the pioneering mind set of second and third generation farmers and the attitudes of neighbors and bankers that "clean fields" are better. Economic compatibility involves the incentives or penalties for wetland use and their effect on the bottom line. Finally, institutional/legal compatibility includes property rights issues and the role of the various levels of government.

Mutually Exclusive

Activities are mutually exclusive when they can not both be done at the same time in the same place. Exclusiveness is a function of space, competition, and philosophy. For example, you can not both go fishing Saturday morning and fly to Tokyo; nor can you build a shopping mall and an airport in the same location. But you can go fishing and read a book, and you can design a shopping concourse within an airport terminal or beneath the runway.

Cultivated crops are spatially incompatible with wetlands in fields (Fig. 1). Wetlands must be adequately drained to provide the optimal soil-water conditions. Spring farming and nesting ducks are also mutually exclusive.

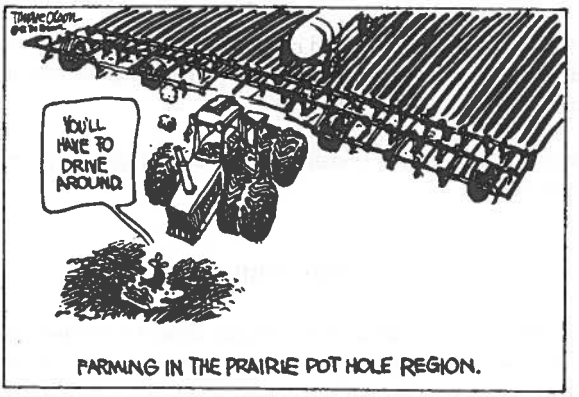

Fig.1. Cartoon by Trygve Olson (*The Fargo Forum*, 1991).

Space: Certainly farmers cannot grow row crops and preserve cattails in the same space. Nor can they operate center pivots through wetlands (although pivot wheel tracks have been built across wetlands). Technology has helped to overcome some of the space compatibility issues, but some will always remain.

Competition: There is also competition among users of wetlands, such as between consumptive users (hunters) and nonconsumptive users (birders).

Philosophy: Philosophy relates back to the culture issue. Farmers were encouraged for a century or longer that wetlands were unproductive and should be drained. This mind set is still strong. Also, the idea that square fields and straight rows are "good farming" prevents some wetland protection.

Compatible

Some wetland and agriculture activities that are spatially exclusive are compatible temporally. In other words, while two activities cannot be carried out simultaneously, they may be feasible sequentially. Others may be compatible in space and time, such as grazing, haying, and sediment control.

Irrigation and other forms of intensive farming might, at first, be thought of as exclusive; but accommodations can be made for "odd areas". In this instance, wetlands can be part of the agricultural landscape, while not actually in the field.

Government rules and regulations have forced farming to be more compatible with wetlands. They also raise the cost of production and may shift environmental problems elsewhere in the landscape or to another country. In other words, forced compatibility comes at a cost.

As demands for agricultural production increase so does production technology. In moving from past to present, technology has both contributed to the conflict and helped to resolve it. It has contributed through introduction of bigger equipment that makes it difficult to farm around obstacles in fields. Technology has helped lesson the conflict through precision or site-specific farming and reduced tillage management.

Complementary

Man-made wetlands, such as sewage lagoons for feedlot runoff, provide both agricultural and natural functions. Wetlands maintained for water supply can provide flood control and wildlife habitat. The sustainable agriculture movement, especially its emphasis on biodiversity, will lead to more complementarity between agriculture and wetlands. Fee hunting, popular in South Dakota, Texas, and some other states, can help wetlands become an economic complement to a farm enterprise.

Each of the constraints to complementarity--physical, cultural, economic, and institutional--can be eased with research, development, and changes in attitudes and institutional structures. However, there may not be a much room substantial improvements in complementarity, unless uses for indigenous wetland plants, such as cattails, are developed.

CONCLUSIONS

The chasm that once was deep and wide between agricultural and wetland interests has narrowed and become less deep due to changes in technology and culture. Some of the change was forced by legislation, other by economics and culture. Farmers have adapted to these changes--they usually do. The following six papers are nice examples of some of the compatibility and cooperation that is occurring.

REFERENCES

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